

# Lab D Cleanroom

## Detector assembly and characterization

Micro-detector assembly is accomplished using optical *coordinate measuring machines (CMMs)* with magnification of over 1000x in order to achieve micron accuracy during assembly of components. Lab D teams interface with designers, engineers, and physicists from Fermilab and as well as from other laboratories to address the R&D phase, reviewing, modifying (when necessary) and implementing all fixturing for component sub-assemblies to barrel assemblies. Once all R&D procedures are proven and finalized, the teams are responsible for production and final assembly of the detectors.

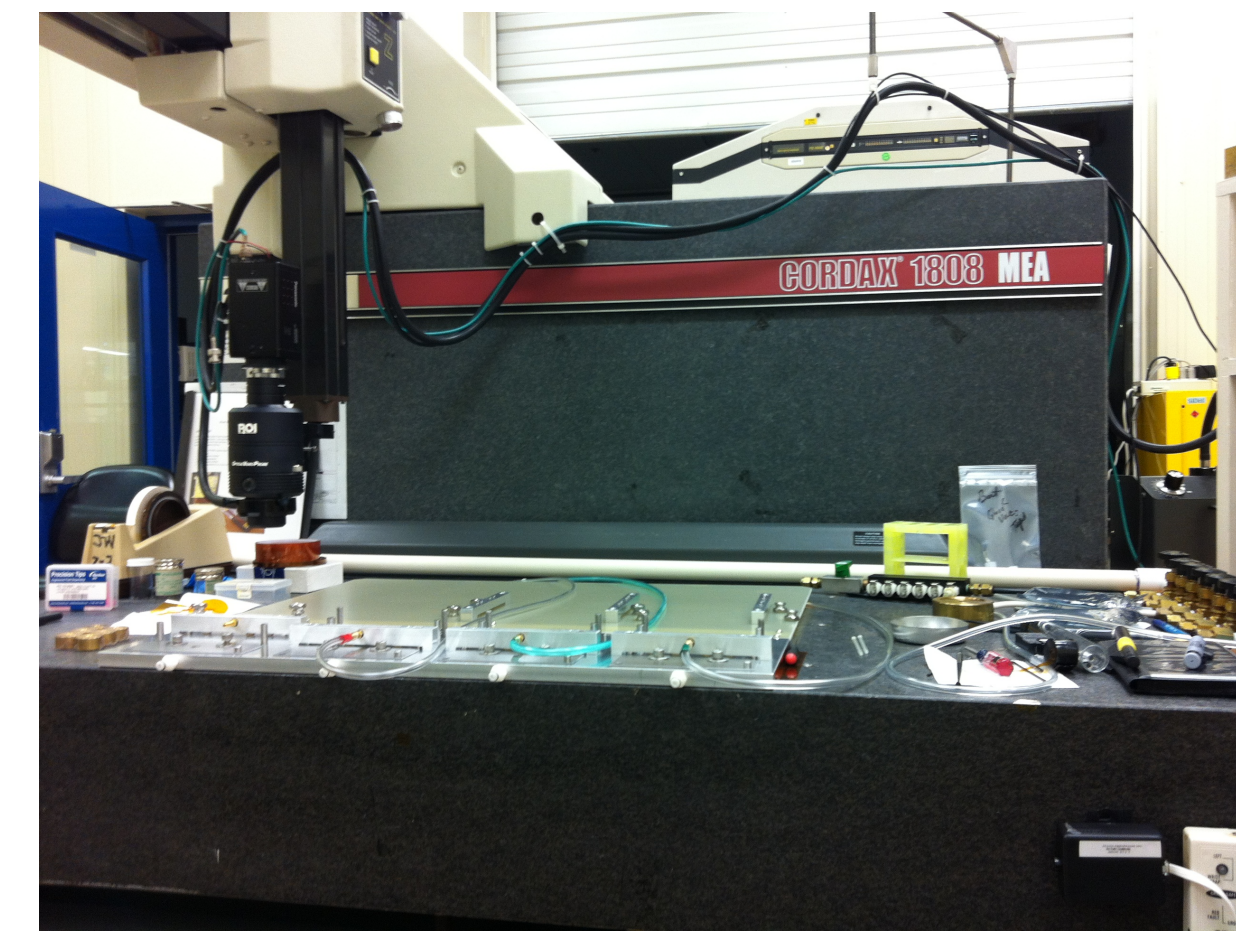
Lab D has four *probe stations* enabling precision measurements of integrated circuits at the wafer level.

Past and present Fermilab projects include CDF, D0, DES, CMS FPIX & TOB. Projects for other labs include STAR (BNL), Phenix VTX & FVTX (BNL), SVT (JLab)

### *CORDAX 1808*

There are 3 CORDAX 1808 machines in Lab D

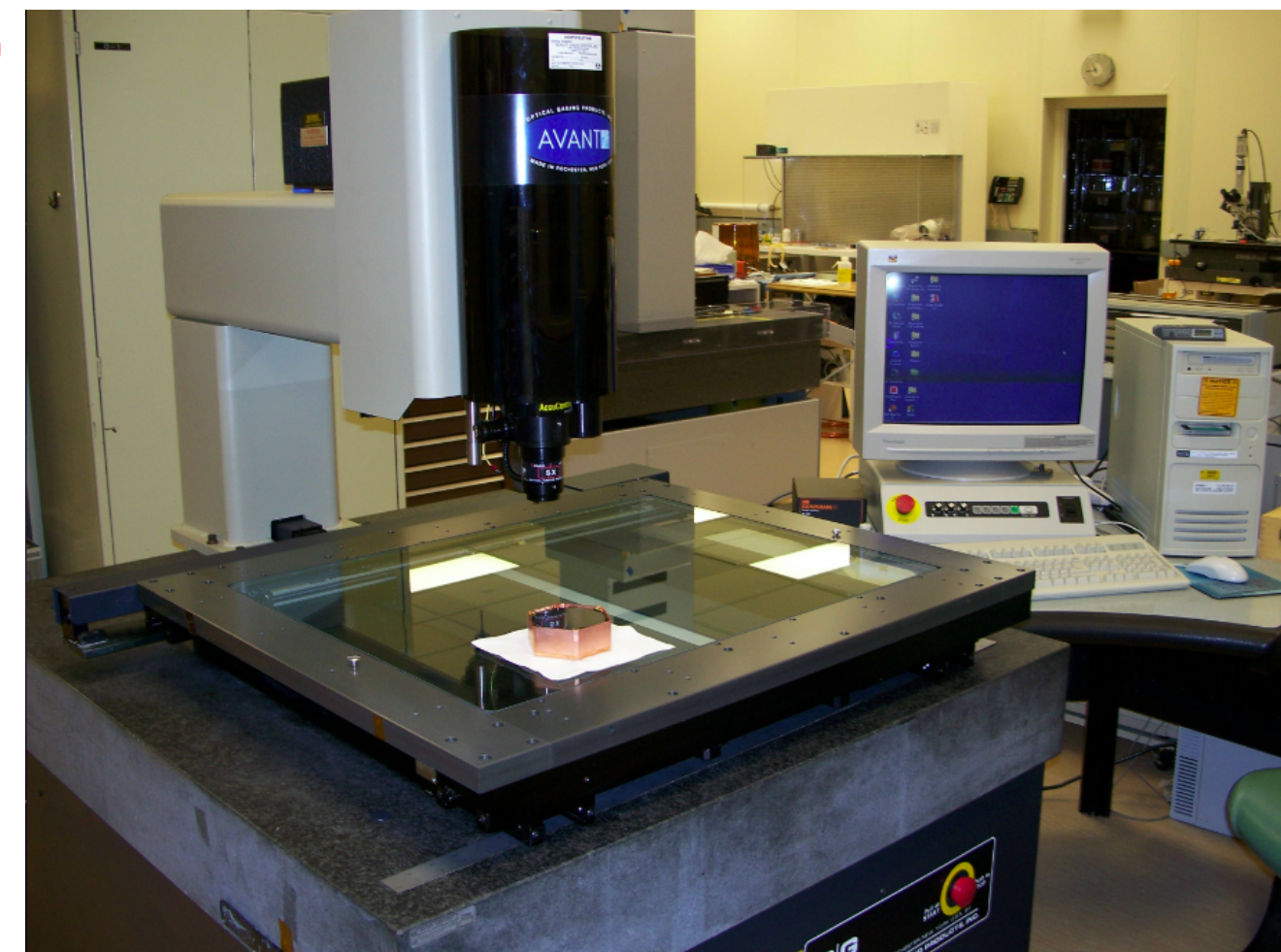
- Optical CMM (originally touch probe)
- Manual motion
- Computer readout



### *OGP (Optical Gaging Products) Video Inspection System*

There is one OGP system in Lab D

- Optical CMM (touch probe option)
- Autofocus and motion control
- Computer readout



### *ZEISS UMM 500*

There are 2 Zeiss UMM 500 machines in Lab D

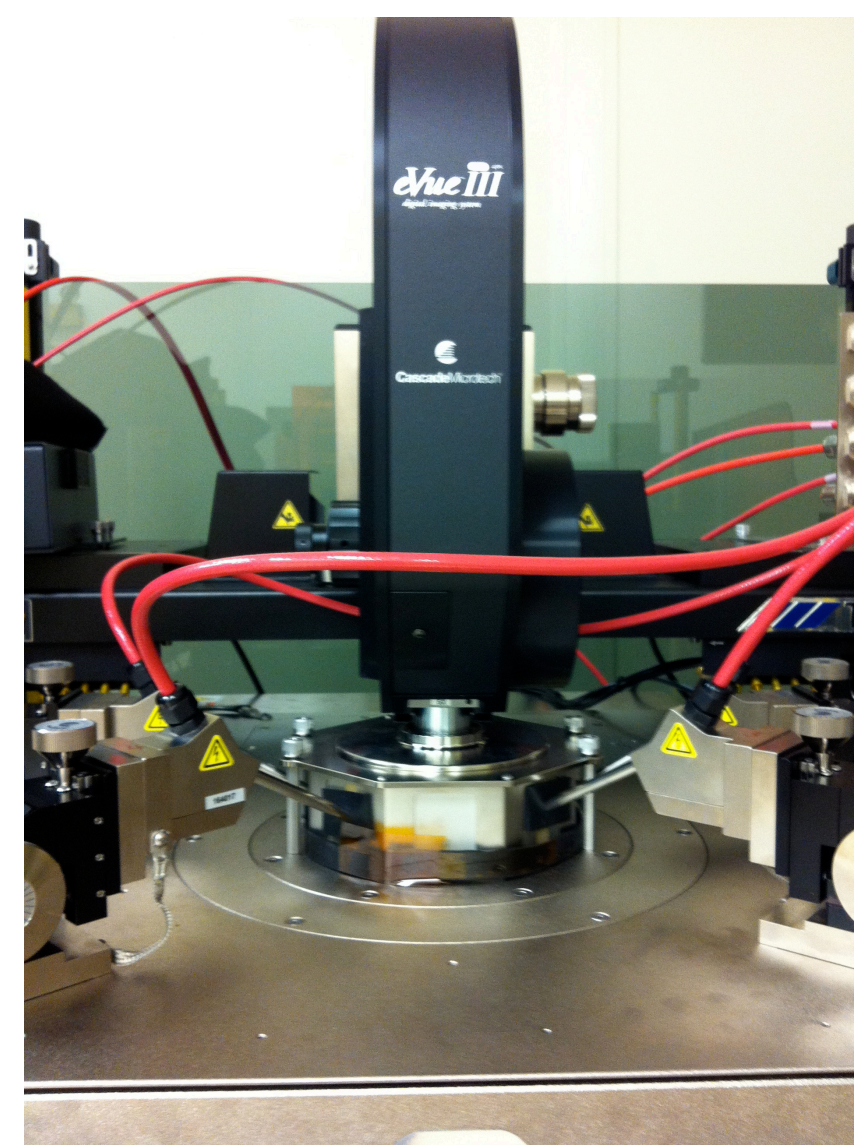
- Optical CMM (touch probe option)
- Computer readout



### *Cascade Microtech probe station*

There is one Cascade Microtech probe station in Lab D

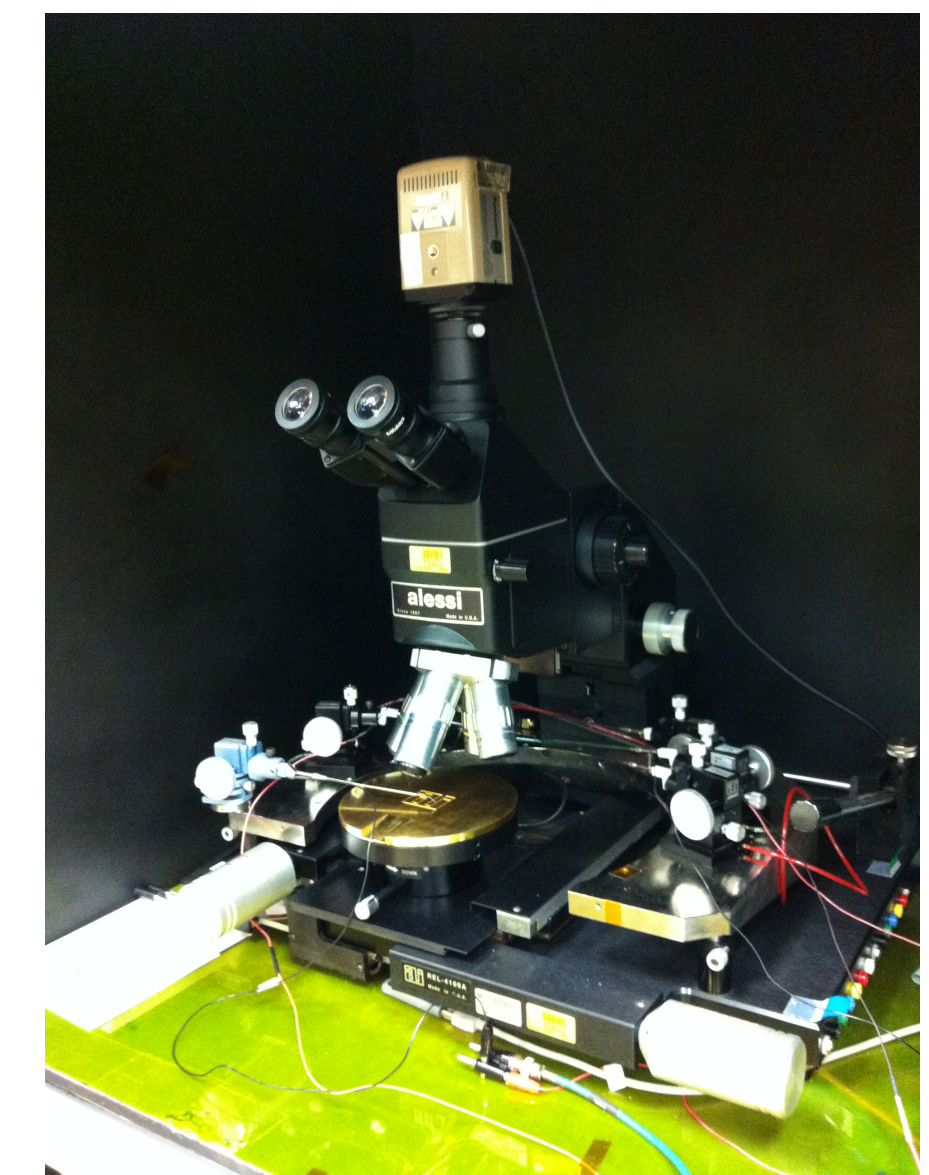
- Automated
- Cooling
- Computer control and readout



### *Probe stations*

There are 3 smaller probe stations

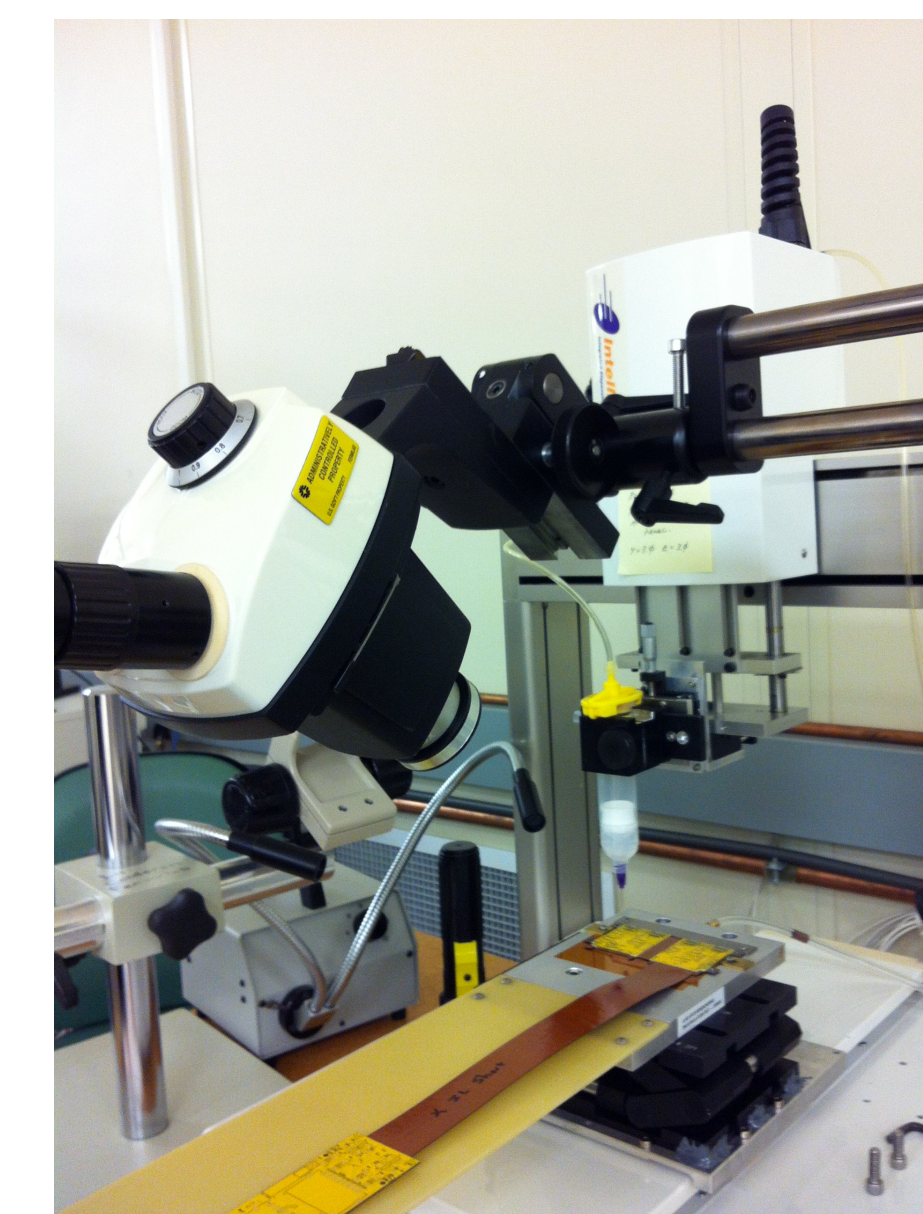
- Computer readout



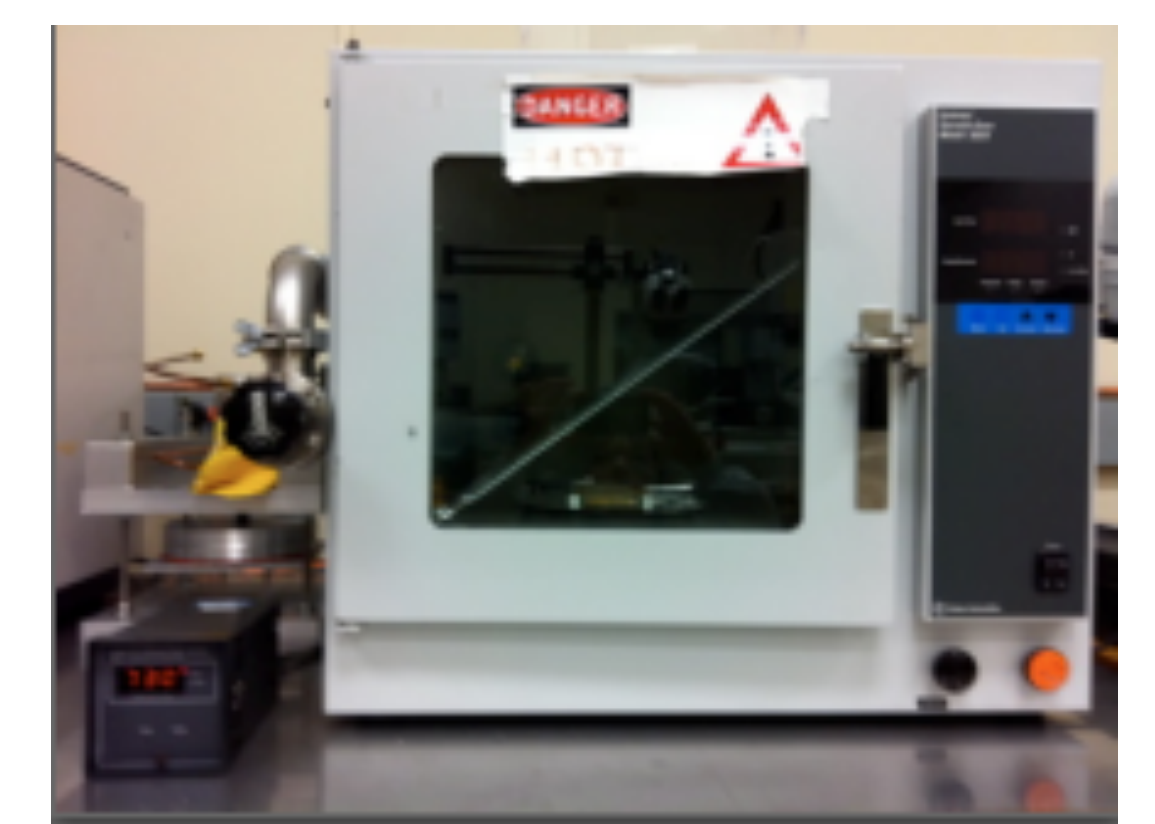
### *Encapsulation tool, imaging microscopes, vacuum ovens, sonic cleaners*

Additional support equipment available in Lab D

- Encapsulation tool
- Programmable vacuum ovens
- Imaging microscopes
- Sonic cleaner



Encapsulation tool



Vacuum oven